United States Department of the Interior

NATIONAL PARK SERVICE
Grand Canyon National Park
P.O. Box 129
Grand Canyon, Arizona 86023-0129

IN REPLY REFER TO:

Dear Interested Party:

Reference: Grand Canyon National Park,

Subject: Public Review of Environmental Assessment

Enclosed is an environmental assessment (EA) for the proposed closure by capping of two landfills on the North Rim. The proposed activities are required by Federal and state regulations.

If you wish to comment on this EA, you may mail your comments to the Superintendent, Grand Canyon National Park, Attn: Sara White, Compliance Officer, P.O Box 129, Grand Canyon, AZ 86023. Please be aware that names and addresses of respondents may be released if requested under the Freedom of Information act. Our practice is to make comments, including names and home addresses of respondents, available for public review during regular business hours. Individual respondents may request that we withhold their home address from the record, which we will honor to the extent allowable by law. There also may be circumstances in which we would withhold from the record a respondent's identity, as allowable by law. If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment. We will make all submissions from organizations or business, and from individuals identifying themselves as representatives or officials of organizations or businesses, available for public inspection in their entirety. Anonymous comments may be included in the public record. However, the National Park Service is not legally required to consider or respond to anonymous comments. We would appreciate receiving your comments no later that **September 24, 2001**. If you have any questions regarding this project, please call Sara White at 928-638-7956. The EA is available at the following website as well http://www.nps.gov/grca/mgmt/index.htm.

Sincerely,

Joseph F. Alston
Superintendent

Enclosure

Grand Canyon National Park,
North Rim

North Rim Marble Flats and Lindberg Hill Inactive Landfill Closures

Draft Environmental Assessment

August 2001

Note to Reviewers and Respondents

If you wish to comment on the environmental assessment, you may mail comments to the name and address below. Our practice is to make comments, including names and home addresses of respondents, available for public review during regular business hours. Individual respondents may request that we withhold their home address from the record, which we will honor to the extent allowable by law. There also may be circumstances in which we would withhold from the record a respondent's identity, as allowable by law. **If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment.** We will make all submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, available for public inspection in their entirety.

Please Address Comments to:
Joseph Alston
Superintendent, Grand Canyon National Park
Attn: Sara White, Chief Compliance Officer
P.O. Box 129
Grand Canyon, AZ 86023

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Chapter 1- Purpose and Need for Action

INTRODUCTION

The environmental analysis (EA) was prepared in accordance with the regulations of the Council on Environmental Policy Act (CEQ) (40 CFR 1500 et seq.) and in part 516 of the U.S. Department of the Interior's Departmental Manual (516 DM).

The National Environmental Policy Act (NEPA) is the basic national charter for environmental protection; among other actions it calls for an examination of the impacts on the components of affected ecosystems. The 1995 GMP, 2001 NPS Management Policies, NPS-77 (Natural Resources Management), DO-12 (Conservation Planning, Environmental Impact Analysis, and Decision-making) among other National Park Service (NPS) and park policies, provides general direction for the protection of the natural abundance and diversity of the park's naturally occurring communities.

Various agencies have been contacted and consulted as part of this planning and environmental analysis effort. Appropriate federal, state, and local agencies have been contacted for input, review, and permitting in coordination with other legislative and executive requirements.

This environmental assessment provides disclosure of the planning and decision-making process and potential environmental consequences of the alternatives. The analysis of environmental consequences was prepared on the basis of a need to adequately analyze and understand the consequences of the impacts related to the proposed park developments and to involve the public and other agencies in the decision-making process. In implementing this proposal, the NPS would comply with all applicable laws and executive orders.

PURPOSE AND NEED

Grand Canyon National Park (GCNP) proposes to close two inactive landfills on the North Rim of Grand Canyon National Park, Coconino County, Arizona. This proposal implements the intent of the *1995 General Management Plan* (GMP) for GCNP by restoring (as close as possible) the landfill sites to natural conditions. Also, this proposal will be in accordance with the Resource Conservation Recovery Act (RCRA) Subtitle D and Arizona Department of Environmental Quality (ADEQ) solid waste regulations. The closure of each landfill will comply with RCRA Subtitle D and ADEQ regulations, which is to protect the environment, particularly groundwater resources. GCNP has been cited by the ADEQ for solid waste violations at the landfills and is currently under an ADEQ consent order (Docket # S-48-0) to close and cap the two North Rim inactive landfills.

MANAGEMENT AND PLANNING HISTORY

Grand Canyon National Park is currently operating under the direction of the *1995 General Management Plan* (GMP). This plan provides guidance for resource management, visitor use, and general development for a period of 10 to 15 years. The management objectives for Grand Canyon National Park, which are based on the park visions, set the direction for future park management. The GMP directs the park to the maximum extent possible, restore altered ecosystems to their natural conditions.

MARBLE FLATS AND LINDBERG HILL PHYSICAL SETTING AND OPERATIONAL BACKGROUND

Marble Flats Inactive Landfill

The Marble Flats Landfill is an inactive sanitary landfill covering approximately 12 acres, located on the North Rim of GCNP (Appendix A). The site is remotely located with respect to the Park Service maintenance facilities and visitor use area at the North Rim of the Grand Canyon. The site is located approximately 1.5 miles north of the North Rim ranger station and approximately 2.1 miles west of the main North Rim road (State Highway 67). Access to the site is gained via an unpaved road leading to Widforss Trailhead. The site is situated in an open meadow surrounded by heavy forest growth. The vegetation surrounding the landfill is Ponderosa Pine and mixed conifer. The former waste disposal trenches are covered with approximately 2 feet of native soils consisting of mixtures of clays and silts with variable amounts of sand, gravel, and rock fragments.

The topography of the former disposal area is characterized by a shallow undulating surface with maximum relief of approximately 3 ft. The surface of the landfill generally slopes from the west toward the east. The landfill is an open meadow and is surrounded on four sides by forested low bedrock hills.

There are no active wells in the vicinity of the site and depth to groundwater is reportedly in excess of 2,000 ft. below ground surface (HLA 1994).

The date the site began landfill operations is unknown. Marble Flats operated as the principal solid waste disposal facility on the North Rim of GCNP. Beginning in 1991, the waste stream from the North Rim park and concessionaire facilities were diverted to a municipal solid waste disposal facility in Fredonia, Arizona.

The site was historically operated using the trench and fill method of waste disposal. Wastes were placed in the unlined trenches, portions of the excavated soil were used as intermediate cover, and covered the filled waste disposal trenches. The waste stream consisted primarily of domestic refuse and mule manure. The nearest Park facilities are located approximately 8 to 10 miles from the site. Mean annual precipitation in this area is reportedly less than 25 in. (HLA 1994). Operation records show the average daily volume of solid waste disposed was less than 20 tons. The Marble Flats landfill meets the State of Arizona definition of a “small, dry, remote landfill” and has been exempted for obtaining an Aquifer Protection Permit (APP) by the Arizona Department of Environmental Quality (ADEQ), pursuant to ARS 49-241. This determination is documented in a memo from ADEQ to the NPS dated January 28, 1994 (Ref. PR94-35).

Lindberg Hill Inactive Landfill

The Lindberg Hill Landfill is an approximately 5-acres sanitary landfill that operated from approximately 1984 to 1991 (Appendix A). The site is located approximately 7 miles north of the North Rim ranger station and approximately 0.5 miles east of the main North Rim road (State Highway 67). The site is reached by an unpaved access road off Highway 67. A locked metal gate restricts vehicular traffic to the site. The site was operated as a stone quarry for building, before use as a landfill. Similar to the Marble Flats Landfill, the Lindberg Hill Landfill is remotely located within the GCNP with respect to the existing Park Service maintenance facilities and visitor use areas of the North Rim of the Grand Canyon.

The site is located on a shallow sloping terrace and is surrounded by heavy forest growth. The former waste disposal area is covered with approximately 1 to 2 ft. of native soils consisting of silty sands containing variable amounts of limestone rubble. The surface of the landfill slopes are 1 to 2 degrees from the northeast toward the southwest. Surface water flows onto the site from a slight rise east of the landfill, then flows across the disposal area as sheet flow and leaves the site and flows down a steep slope at the toe of the landfill

There are no active wells in the vicinity of the site and depth to groundwater is reportedly in excess of 2,000 ft. below ground surface (HLA 1994).

The Lindberg Hill Landfill began accepting waste in 1984 and ceased accepting waste by 1991. The NPS used this site primarily for the disposal of construction debris consisting of scrap building materials, concrete rubble and asphalt. NPS personnel have also observed several kitchen appliances, tires, and scrap timber (vegetative debris) placed in the landfill. Wastes were placed into the unlined former rock quarry and the materials were periodically covered with soil. The landfill is in a remote location with annual precipitation less the 25-in., and the average daily amount of solid waste disposed was less than 20 tons. As a result of the type of waste accepted, its location within the GCNP, and the low annual amount of precipitation, the Lindberg Hill site has been exempted from obtaining an APP, pursuant ARS 49-241. This determination is documented in a memo dated August 27, 1993 (Ref. AU93: 0465).

Marble Flats and Lindberg Hill inactive landfills are currently in non-compliance with RCRA and ADEQ Solid Waste Regulations

The deficiencies listed in the 2000 ADEQ Consent Order are as follows:

- No landfill post-closure plan submitted to ADEQ;
- No interim methane monitoring;
- No final cover.

In Spring 1997, the park contracted with EA Engineering, Science, and Technology to prepare engineering reports which would develop the Closure, Post Closure Plans and the Landfills Construction specifications required by ADEQ. These reports evaluated the existing site conditions, waste characterization, and closure activities including a description of the final cover, site drainage, costs and a schedule for completing all activities necessary to satisfy the closure criteria identified in 40 CFR 260.60.

The January 2000 engineering reports evaluated the following two closure Alternatives:

1) Alternative Soil Closure Cap

2) ADEQ Soil Closure Cap.

In November 2000, an interdisciplinary team from Grand Canyon National Park (GCNP) met to review proposed alternatives for the closure of the two inactive landfills located on the North Rim. This team evaluated the closure activities and addressed issues and impacts to the environment that might occur during construction of closure.

A Value Analysis (VA), completed in February 2001, discussed the following Alternatives:

- No Action
- Alternative Soil Closure Cap
- ADEQ Soil Closure Cap

A Value Analysis is a systematic approach to evaluating alternatives in context with values of identified issues, concerns and functions.

This project was presented to the Development Advisory Board in June 2001 for approval of expenditures of funds.

Pubic scoping occurred on November 29, 2000 and no comments were received concerning the two landfill sites. Affiliated tribes and the State Historic Preservation Office (SHPO) were also sent a scoping letter concerning the landfill sites and no comments or concerns were brought to the attention of park staff.

ISSUES AND IMPACT TOPICS

Issues are objections or disputes with a proposed action, based on some anticipated effect. The interdisciplinary team identified issues. Once issues were identified, they were used to help formulate the alternatives and mitigation measures. Impact topics were then selected for detailed analysis based on substantive issues; environmental statutes, regulations and executive orders; and NPS Management Policies (2001). A summary of the impact topics and rationale for selection/dismissal are given below.

Impact Topics Analyzed in this Document

Exotic Vegetation and Noxious Weeds:

Proposed soil cover could create conditions favorable to exotic vegetation and noxious weeds. In addition, construction equipment could spread existing populations of exotic vegetation or introduce seeds to the proposed construction sites. Therefore, this topic will be analyzed in this document.

Visitor Experiences:

Project construction would affect visitors due to an increase in traffic from construction equipment. Construction activities may have the potential to temporarily disrupt traffic flow due to the location of the landfills to the main entrance road. Marble Flats landfill is adjacent to the proposed designated wilderness area. The construction and traffic from trucks may affect the visitor experience in the adjacent proposed wilderness zone. Since the visitor experience may be affected, this topic will be analyzed in this document.

Impact Topics Dismissed from Further Analysis

Soils:

Proposed activities have no new impacts to the soil resource conditions because the area has been impacted by previous landfill operations. Therefore, this topic will be not be analyzed in this document.

Geology and Topography:

Alteration of geologic processes and features are not proposed in any of the alternatives. No major earthmoving or blasting activities are proposed that would impact the geologic processes or features or cause substantial alteration of the topography. Therefore, this topic will not be analyzed in this document.

Water Resources:

Section 404 of the Clean Water Act (33 USC 1344) and Section 10 of the Rivers and Harbors Act of 1899 (33 USC 401 et seq.) - The U.S. Army Corps of Engineers issues permits for work affecting navigable waters and wetlands of the United States. If any unknown hazardous waste is found in areas proposed for development or visitor use, the NPS would comply with the Comprehensive Environmental Response Compensation and Liability Act (42 USC 9601 et seq.) to determine if resources are being polluted by the substance or if it presents a health and safety issue. If any excavated material is determined to be hazardous, the NPS would comply with the Resource Conservation and Recovery Act (42 USC 6901 et seq.)

The required compliance with the applicable federal closure guidelines of 40 CFR Parts 257 & 258 of the Resource Conservation and Recovery Act will assure protection of surface water and ground water. The depth to ground water is greater than 2000 feet and there are no significant surface water drainages at either inactive landfill site. No surface water and water quality issues would be impacted by this proposal. Therefore, this topic will not be analyzed in this document.

Threatened and Endangered Species (TES):

Threatened, Endangered, and Species of Concern – Plants. The U.S. Fish and Wildlife Service has determined that six federally listed proposed, threatened, or endangered plant species may occur or have habitat in the Grand Canyon area, Coconino County. These species are:

Brady pincushion cactus (*Pediocactus bradyi*) – endangered.

Navajo sedge (*Carex specuicola*) – threatened.

San Francisco peaks groundsel (*Senecio franciscanus*) – threatened.

Sentry milk-vetch (*Astragalus cremnophylax* var. *cremnophylax*) – endangered.

Siler pincushion cactus (*Pediocactus sileri*) – threatened.

Welshes milkweed (*Asclepias welshii*) – threatened.

The above federal and state listed species do not exist at either of the locations for the proposed landfill closures. This determination is based on site specific knowledge of the areas, reconnaissance of the areas, knowledge of the species in question, and professional judgement. There would be no effect on any of the federal or state listed plant species due to the fact they are not present. Therefore, this topic will not be analyzed in this document.

Threatened and Endangered Species (TES): Wildlife

Endangered Species Act of 1973, as amended (16 USC 1531 et seq.). Section 7 of the Endangered Species Act requires all federal agencies to consult with the U.S. Fish and Wildlife Service to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of listed species or critical habitats.

Due to the nature of the construction, soil unloading, contouring of soil, and installation of temporary to permanent methane monitoring wells. This project does not have any equipment proposed that will have an effect on any T& E species or critical habitat. All work will be confined within the landfill site. The areas will be returned as closely as possible to their original condition. A determination of no effect is based on site specific knowledge, reconnaissance of the areas,

knowledge of the species in question, and professional judgement. This project would have no effect on any federal or state listed special status species or critical habitats. Therefore, this topic will not be analyzed in this document.

Sound Preservation and Noise Management:

The NPS is mandated to the purpose of the Director's Order 47 to articulate the National Park Service's operational policies that will require, to the fullest extent practicable, the protection, maintenance, or restoration of the natural soundscape resource in a condition unimpaired by inappropriate or excessive noise sources. Natural sounds are intrinsic elements of the environment that are often associated with parks and park purposes. They are inherent components of "the scenery and the natural and historic objects and the wild life" protected by the NPS Organic Act. They are vital to the natural functioning of many parks and may provide valuable indicators of the health of various ecosystems. Intrusive sounds are of concern to the NPS because they sometimes impede the Service's ability to accomplish its mission.

Noise impacts from this project will only last the duration of the construction. After construction is completed, any negligible noise level impacts will be returned to its natural condition. Most construction would occur during daylight hours when roads and the associated traffic already impact the two landfill areas. Any additional traffic will only be temporary and will not effect or will negligibly effect the areas in the short term. Since, this project would have no measurable effects on the soundscape, this topic will not be analyzed in this document.

Air Quality:

Clean Air Act, as amended (42 USC 7401 et seq.) GCNP is designated as a Class I area. Maximum allowable increases (increments) of sulfur dioxide (SO_2), particulate matter, and nitrogen oxides (NO_x) beyond baseline concentrations established for Class I areas cannot be exceeded. Section 118 of the Clean Air Act requires all federal facilities to comply with existing federal, state, and local air pollution control laws and regulations.

Project construction would result in a short-term increase in fugitive dust. Local air quality may be negligibly affected in the short-term from construction activities and emissions from construction equipment. This would last only as long as construction activities occurred and neither overall park air quality nor regional air quality would be affected. Therefore, this topic will not be analyzed in this document.

Cultural Resources:

The NPS is mandated to preserve and protect its cultural resources through the Organic Act of August 25, 1916, and through specific legislation such as the Antiquities Act of 1906, the National Environmental Policy Act of 1969 (as amended), and the National Historic Preservation Act of 1966, NPS Management Policies (2001), the Cultural Resource Management Guideline (DO-28), and the Advisory Council on Historic Preservation's implementing regulations regarding "Protection of Historic Properties" (36 CFR 800). Other relevant policy directives and legislation are detailed in DO-28.

Section 106 of the National Historic Preservation Act of 1966 requires that federal agencies having direct or indirect jurisdiction over undertakings consider the effect of those undertakings on properties on or eligible for listing on the National Register of Historic Places and afford the Advisory Council on Historic Preservation and the state historic preservation office an opportunity to comment.

GCNP has and will continue to consult with affiliated American Indian tribes to develop and accomplish its programs in a way that respects the beliefs, traditions, and other cultural values of the American Indian tribes who have ancestral ties to the lands encompassed by the park. The necessity for consultations with American Indians arises from the historic and current government-to-government relationship of the federal government with the American Indian tribes, particularly those that are federally recognized (*Federal Register* 1995 9250-9255), as well as from the related federal trust responsibility to conserve tribal resources. Consultations with American Indians are also required for compliance with a variety of laws and other legal entities, such as presidential executive orders, proclamations, and memoranda; federal regulations; and agency management policies and directives. Examples are the Indian Self-Determination and Education Assistance Act (1975); The American Indian Religious Freedom Act (1978 and as amended in 1994); the native American Graves Protection and Repatriation Act (1990); National Historic Preservation Act (as amended in 1992); the Presidential Memorandum of April 29, 1994, entitled "Government-to-Government Relations With Native American Tribal Governments; and Executive Order 13007 of May 24, 1996, entitled "Indian Sacred Sites"

The 1992 amendments to the National Historic Preservation Act and the Archeological Resources Protection Act provide means whereby information about the character, location, or ownership of archeological sites, historic properties, and ethnographic sites, including traditional and cultural sites, might be withheld from public disclosure. This provision is especially important in cases where disclosure could risk harm to the resource or impede the use of a traditional site by practitioners.

Some of the most important archeological sites in the park are on the Walhalla Glades of the North Rim. In this area, settlement history shows a considerable occupation the period AD 1050 to AD 1150. Habitation sites and their associated agricultural features indicate intensive use of the area for summer farming. Three similar sites occur on Bright Angel Point, near the developed areas.

Across the higher elevations of the North Rim abundant evidence of the historic uses of the park occurs. These sites and features reflect the use of the North Rim by sheepherders, cowboys, and early tourists. Manifestations include cabins, camps, spring modifications, and aspens with historic carvings.

Both the Marble Flats and the Lindberg Hill landfills have been intensively surveyed for cultural resources at various times in the 1990s. No historic properties listed or eligible for listing on the National Register of Historic Places occur within the APE (Area of Potential Effect). A historic fenceline (AZ B:16:341) that is ineligible for the National Register runs through the western portion of the Marble Flats landfill. No historic properties or structures will be affected by any of the alternatives in this proposal. For these reasons discussed above this topic will not be analyzed in this document.

Ethnographic Resources:

Ethnographic resources are defined by NPS as any "site, structure, object, landscape, or natural resource feature assigned traditional, legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it" (*Cultural Resource Management Guideline* – DO-28: 191). The lands of Grand Canyon National Park are traditionally affiliated with the following Indian tribes: Havasupai Tribe, Hopi Tribe, Hualapai Tribe, Kaibab-Paiute Tribe, Navajo Nation, Paiute Indian Tribe of Utah, Pueblo of Zuni, White Mountain Apache and San Juan Southern Paiute Tribe.

There are presently no known ethnographic resources in the area of potential project effect or general vicinity for both landfills. Copies of the environmental assessment will be forwarded to each affiliated tribe for review and comment. If the tribes subsequently identify the presence of ethnographic resources, the NPS would undertake appropriate mitigation measures in consultation with the tribes. As necessary, mitigation would be carried out in accordance with provisions of the Native American Graves Protection and Repatriation Act of 1990. The location of ethnographic sites would not be made public. Because there are no known ethnographic resources within the project areas or general vicinity, ethnographic resources will not be analyzed in this document.

Park Operations:

Operations will be not be affected by the alternatives. Therefore, this topic will not be analyzed in this document.

Environmental Justice:

No alternative would have health or environmental effects on minorities or low-income populations or communities as defined in the Environmental Protection Agency's Draft Environmental Justice Guidance (July 1996). Therefore, this topic will not be analyzed in this document.

Floodplains:

Executive Orders 11988 ("Floodplain Management") require an examination of impacts to floodplains. The 1988 NPS Management Guidelines, DO-2 Park Planning, NPS-12 (National Environmental Policy Act Guidelines), and the 1995 GMP provide guidelines on developments proposed in floodplains. Executive Order 11988, "Floodplain Management," requires all federal agencies to avoid construction within the 100-year floodplain unless no other practical alternative exists. Certain construction within a 100-year floodplain requires that a Statement Of Findings be prepared and accompany a Finding Of No Significant Impact. No portions of the proposal are within the 100-year floodplain. Therefore, no Statement of Findings for floodplains would be prepared. Therefore, this topic will not be analyzed as an impact in this document.

Wetlands:

Executive Order 11990 requires federal agencies to avoid impact on wetlands where possible. The soils, hydrology, and vegetation typical of a wetland do not exist at the landfill sites. No jurisdictional wetlands exist at or near the two inactive landfills on the north rim. This determination is based on site-specific knowledge of the two landfill sites and adjacent areas, knowledge of wetlands, and professional judgement. Therefore, this topic will not be analyzed in this document.

Prime and Unique Farmland:

Prime or unique farmland is defined as soil that particularly produces general crops as common foods, forage, fiber, and oil seed; unique farmland produces specialty crops such as fruits, vegetables and nuts. According to the Natural Resource Conservation Service, there are no prime farmlands associated with the project area. Therefore, this topic will not be analyzed in this document.

Socioeconomic Values:

Socioeconomic values consist of local and regional businesses and residents, the local and regional economy, and park concessions. The local economy and most businesses in the surrounding communities are based on professional services, construction, tourist, sales and services, and educational research. The 1995 GMP EIS discussed the socioeconomic environment and impact extensively.

There may be negligible short-term benefits to the local and regional economy resulting from construction-related expenditures and employment. Therefore, this topic will not be analyzed in this document.

Chapter 2- Alternatives

INTRODUCTION

This section describes three management alternatives for this project. Alternatives were developed to resolve pertinent management issues and address state and federal solid waste regulations. A summary table comparing the environmental consequences of each alternative is presented at the end of the alternatives section.

MITIGATION MEASURES

Mitigation measures are analyzed as part of the action alternatives. These actions have been developed to lessen any potential adverse effects from the proposed action.

The staging area for the construction equipment would be located in a previously disturbed area within the landfill sites. Construction zones would be delineated with construction tape, snow fencing, or some similar material before any construction activity. This will define the construction zone and confine activity to the minimum area required for construction. All protection measures would be clearly stated in the construction specifications and workers would be instructed to avoid conducting activities beyond the construction zone as defined by the construction zone.

To minimize soil erosion at the project site, standard erosion control measures including silt fences and sandbags would be incorporated into the action alternatives.

A cattle guard located just outside of the park entrance station may not be capable of handling the additional vehicle load due to the trucks bringing in soil. The cattle guard will be either be reinforced or a metal plate will be placed on top of the grate to allow for the increased use of trucks.

Visitor Experience:

Visitor experience will be monitored during the course of construction at various locations within the North Rim area to determine the impact of trucks on the main roads to visitors. NPS residents and concessioner staff and employees will be notified by word of mouth and by written flyers to explain the potential impacts to park residents, concessioners and visitors.

Air Quality:

In order to minimize short-term impact to local air quality, water would be applied during construction as necessary to reduce dust. Soil will be compacted immediately (on the landfills) which will reduce the amount of dust particles present at the inactive landfill sites. During closure of the landfill if dust becomes a problem the park will take action to reduce any impacts to air quality. Due to the size and age of the landfills methane production is expected to be negligible. Ongoing interim methane monitoring data at the landfill sites indicated negligible methane was being produced. Should methane monitoring be required all protocols established by ADEQ will be followed. Vehicles will be required to minimize excessive idling to reduce emissions.

An appropriate technical specialist will be contacted when construction begins so air quality monitoring equipment data can be updated.

Exotic Vegetation and Noxious Weeds:

This project will not use borrow material from within the park because the GCNP does not have the available resources to excavate large quantities of soil. Also, there is not a disturbed area on the North Rim large enough with the correct ADEQ soil specifications to support the closure activities at the two landfills. Therefore, a site outside of the park will be found to collect soil for the closure of the landfills.

In order to prevent the introduction and minimize the spread of exotic vegetation and noxious weeds, the following mitigation measures would be incorporated into the action alternatives.

- All construction equipment would be pressure washed before entering the park.
- The staging area for construction equipment would be park approved and treated for exotic vegetation if necessary.
- Parking of vehicles would be limited to existing roads, parking lots, or the staging area.
- Any fill, rock, or additional topsoil needed would be obtained from a source approved by the park's restoration biologist.
    - Park staff would inspect the site the contractor chooses for the borrow material.
    - Park staff would spot check and inspect borrow material for any invasive plant species.
- All areas disturbed by construction would be revegetated using site adapted native seed and/or plants.
- All landscaping efforts would utilize native plants. Funds are set aside for this project to revegetate both inactive landfill closure areas and staging areas.
- Monitoring and follow-up treatment of exotic vegetation would occur for 2 to 3 years after construction is completed. Follow-up treatment could include mechanical, biological, chemical, or additional revegetation treatments.

Threatened and Endangered / Special Status Species:

Construction workers and supervisors would be informed about special status species. In the unlikely event that a Threatened and/or Endangered species (TES) is sited the contract provisions would require the cessation of construction activities until park staff re-evaluates the project. The park could modify the contract for any protection measures determined necessary to protect the discovery.

Cultural Resources:

If previously unknown archeological resources are discovered during construction, all work in the immediate vicinity of the discovery would be halted until the resources could be identified and documented and an appropriate mitigation strategy developed, if necessary, in accordance with the stipulations of the 1995 *Programmatic Agreement Among the National Park Service, the Arizona State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding the General Management Plan/Environmental Impact Statement, Grand Canyon National Park, Arizona*.

All workers would be informed of the penalties for illegally collecting artifacts or intentionally damaging any archeological or historic property. Workers would also be informed of the correct procedures if previously unknown resources were uncovered during construction activities. Data recovery excavations would be carried out to mitigate adverse affects as outlined in the section on environmental consequences.

The NPS has conducted archeological surveys to identify resources in the area of project affect. Should unknown buried deposits be located, data recovery excavations would be undertaken. These subsurface survey and data recovery efforts would be guided by a project-specific research design. Additionally, the NPS would begin consultations under the Native American Graves Protection and Repatriation Act in the event that buried human remains are discovered during archeological excavations or project development.

Soil from the borrow source will be obtained from a site that has had all NEPA and NHPA compliance completed prior to construction at the inactive landfills.

Alternative A – No Action

Marble Flats

The no action alternative would maintain the existing conditions at the landfill on the North Rim and provides the baseline for comparison of the action alternatives. In this alternative, the inactive landfill would not be closed or capped. The landfill would remain inactive and the Grand Canyon National Park would be in violation of federal and state solid waste laws.

Lindberg Hill

The no action alternative would maintain the existing conditions at the landfill on the North Rim and provides the baseline for comparison of the action alternatives. In this alternative, the inactive landfill would not be closed or capped. The landfill would remain inactive and the Grand Canyon National Park would be in violation of federal and state solid waste laws.

Alternative B -Alternative-Soil Closure Cap – Preferred Alternative

Marble Flats

Construction proposed in this alternative would only disturb the footprint of the landfill area (approx. 12 acres). It would involve an alternative capping system, which would follow ADEQ solid waste rules and regulations, best protect natural resources; and minimize potential negative impacts to the surrounding environment. This alternative would also maintain the park-quality of the site by restoring it to an open meadow.

This alternative consists of:

- This action will use additional soil as a cap for completion of closure. Maximum 9-in. and minimum 6-in. erosion layer (topsoil layer) consisting of locally available soil that will support native vegetation will be placed over the existing soil cover.
- Final grade slopes may have additional soil layer added to them with a soil permeability of 1 X 10^{-5} cm/sec. This additional soil layer will serve as an infiltration layer, consistent with the requirements of the ADEQ closure capping requirements. The site would be graded to follow a natural (approx. 1%) gradient to promote positive drainage (especially in depressed areas), but not artificially created over the entire site.
- Erosion layer will be graded to minimize infiltration of precipitation into the waste layer while following the existing gradient at the site to promote natural drainage.

- Temporary methane monitoring already in existence will be permanently placed at the perimeter of the landfill site. This is required by ADEQ regulations.
- Soil importation would include 11,200 cubic yards of borrow material and 7,100 cubic yards of topsoil material. A total of 18,300 cubic yards of imported soil. Assuming 12 cubic yard trucks, approximately 1525 truck loads would be require for closure of the landfill over the 4 months construction time.
- A hydrologic analysis of the site will be performed to estimate the amount of runoff generated during the 100-year design storm based on the proposed conditions of the site. The final grades of the landfill will be used to delineate drainage areas and flow paths.
- The Urban Hydrology for Small Watershed Technical Release No. 55 (2^{nd} edition) by the U.S. Department of Agriculture Soil Conservation Service will be the method used to compute the peak flow rates for each drainage area.
- Drainage swales will be designed to allow passage of the peak flow rate without causing erosion on the sides or bottom of the swales, or at the outfall point.
- This alternative cover was approved by ADEQ in June 2001.

General Construction Schedule:

Construction would take approximately 4 months, starting on or about September 2001; however, weather conditions or other unexpected events could delay construction. If this occurs construction would be postponed to September 2002.

Lindberg Hill

Construction proposed in this alternative would only disturb the footprint of the landfill area (approximately 5 acres). It would involve an alternative capping system, which would follow ADEQ solid waste rules and regulations, best protect natural resources; and minimize potential negative impacts to the surrounding environment. This alternative would also maintain pre-landfill conditions by restoring it to an open meadow.

This alternative consists of:

- This action will use additional soil as a cap for completion of closure. Maximum 1-foot and minimum 6-in. erosion layer (topsoil layer) consisting of locally available soil that will support native vegetation will be placed over the existing soil cover.
- Final grade slopes may have additional soil added with a soil permeability of 1×10^{-5} cm/sec. This additional soil layer will serve as an infiltration layer, consistent with the requirements of the ADEQ closure capping requirements. The site would be graded to follow a natural (approx. 7%) gradient to promote positive drainage (especially in depressed areas), but not artificially created over the entire site.
- Erosion layer will be graded to minimize infiltration of precipitation into the waste layer while following the existing gradient at the site to promote natural drainage.
- Temporary methane monitoring already in existence will be permanently placed at the perimeter of the landfill site. This is required by ADEQ regulations.
- Soil importation would include 1,290 cubic yards of borrow material and 880 cubic yards of topsoil material. A total of 2,170 cubic yards of imported soil. Assuming 12 cubic yard

trucks, approximately 181 truck loads would be require for closure of the landfill over the 4 months construction time.

- A hydrologic analysis of the site will be performed to estimate the amount of runoff generated during the 100-year design storm based on the proposed conditions of the site. The final grades of the landfill will be used to delineate drainage areas and flow paths.
- The Urban Hydrology for Small Watershed Technical Release No. 55 (2^{nd} edition) by the U.S. Department of Agriculture Soil Conservation Service will be the method used to compute the peak flow rates for each drainage area.
- Drainage swales will be designed to allow passage of the peak flow rate without causing erosion on the sides or bottom of the swales, or at the outfall point.
- This alternative cover was approved by ADEQ in June 2001.

General Construction Schedule:

Construction would take approximately 4 months, starting on or about September 2001; however, weather conditions or other unexpected events could delay construction. If this occurs construction would be postponed to September 2002.

Alternative C – ADEQ Closure Cap

Marble Flats

Construction proposed in this alternative would only disturb the footprint of the landfill area (approximately 12 acres). It would involve the ADEQ capping system, which would follow ADEQ solid waste rules and regulations.

This alternative consists of:

- This action will use additional soil as a cap for completion of closure. Maximum 9-in. and minimum 6-in. erosion layer (topsoil layer) consisting of locally available soil that will support native vegetation will be placed over the existing soil cover.
- Final grade slopes may have additional soil layer added to with a soil permeability of 1×10^{-5} cm/sec. This additional soil layer will serve as an infiltration layer, consistent with the requirements of the ADEQ closure capping requirements. The site would be graded to follow a natural (approx. 1%) gradient to promote positive drainage (especially in depressed areas), but not artificially created over the entire site.
- Erosion layer will be graded to minimize infiltration of precipitation into the waste layer while following the existing gradient at the site to promote natural drainage.
- Temporary methane monitoring already in existence will be permanently placed at the perimeter of the landfill site. This is required by ADEQ regulations.
- Soil importation would include 21,300 cubic yards of borrow material and 7,100 cubic yards of topsoil material. A total of 28,400 cubic yards of imported soil. Assuming 12 cubic yard trucks, approximately 2,370 truck loads would be require for closure of the landfill over the 4 months construction time.

- A hydrologic analysis of the site will be performed to estimate the amount of runoff generated during the 100-year design storm based on the proposed conditions of the site. The final grades of the landfill will be used to delineate drainage areas and flow paths.
- The Urban Hydrology for Small Watershed Technical Release No. 55 (2nd edition) by the U.S. Department of Agriculture Soil Conservation Service will be the method used to compute the peak flow rates for each drainage area.
- Drainage swales will be designed to allow passage of the peak flow rate without causing erosion on the sides or bottom of the swales, or at the outfall point.

General Construction Schedule:

Construction would take approximately 4 months, starting on or about September 2001; however, weather conditions or other unexpected events could delay construction. If this occurs construction would be postponed to September 2002.

Lindberg Hill

Construction proposed in this alternative would only disturb the footprint of the landfill area (approximately 5 acres). It would involve the ADEQ capping system, which would follow ADEQ solid waste rules and regulations.

This alternative consist of:

- This action will use additional soil as a cap for completion of closure. Maximum 9-in. and minimum 6-in. erosion layer (topsoil layer) consisting of locally available soil that will support native vegetation will be placed over the existing soil cover.
- Final grade slopes may have additional soil layer added to with a soil permeability of 1×10^{-5} cm/sec. This additional soil layer will serve as an infiltration layer, consistent with the requirements of the ADEQ closure capping requirements. The site would be graded to follow a natural (approx. 7%) gradient to promote positive drainage (especially in depressed areas), but not artificially created over the entire site.
- Erosion layer will be graded to minimize infiltration of precipitation into the waste layer while following the existing gradient at the site to promote natural drainage.
- Temporary methane monitoring already in existence will be permanently placed at the perimeter of the landfill site. This is required by ADEQ regulations.
- Soil importation would include 2,600 cubic yards of borrow material and 880 cubic yards of topsoil material. A total of 3,480 cubic yards of imported soil. Assuming 12 cubic yard trucks, approximately 290 truck loads would be require for closure of the landfill over the 4 months construction time.
- A hydrologic analysis of the site will be performed to estimate the amount of runoff generated during the 100-year design storm based on the proposed conditions of the site. The final grades of the landfill will be used to delineate drainage areas and flow paths.
- The Urban Hydrology for Small Watershed Technical Release No. 55 (2nd edition) by the U.S. Department of Agriculture Soil Conservation Service will be the method used to compute the peak flow rates for each drainage area.
- Drainage swales will be designed to allow passage of the peak flow rate without causing erosion on the sides or bottom of the swales, or at the outfall point.

General Construction Schedule:

Construction would take approximately 4 months, starting on or about September 2001; however, weather conditions or other unexpected events could delay construction. If this occurs construction would be postponed to September 2002.

Environmentally Preferred Alternative

The environmentally preferred alternative is determined by applying the criteria suggested in the National Environmental Policy Act of 1969 (NEPA), which is guided by the Council on Environmental Quality (CEQ). The CEQ provides direction that "[t]he environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in NEPA's Section 101:

- Fulfil the responsibilities of each generation as trustee of the environment for succeeding generations;
- Assure for all generations safe, healthful, productive, and esthetically and culturally pleasing surroundings;
- Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
- Preserve important historic, cultural and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice;
- Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities; and
- Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Out of the action alternatives, Alternative B is the environmentally preferable alternative. This is due to the fact that Alternative B would require less imported soil to complete the landfill closure for Marble Flats and Lindberg Hill. The amount of truckloads needed to import the soil would be considerably less, which would be the least impact to GCNP.

Comparison of Alternatives

The following section summarizes the alternatives by proposed activities and their impacts.

Table 2-1 summarizes the proposed activities, which are described in detail under each alternative.

Comparison of Alternatives and the Proposed Activities

Proposed Activity	Alternatives					
	A		B		C	
	Marble Flats	Lindberg Hill	Marble Flats	Lindberg Hill	Marble Flats	Lindberg Hill
Borrow Material (cu^3/yd)	N/A	N/A	11,200	1,290	21,300	2,600
Topsoil Material (cu^3/yd)	N/A	N/A	7,100	880	7,100	880
Truck Loads	N/A	N/A	1525	181	2,370	290
Truck Loads/day *(1 month delivery/20days)	N/A	N/A	76	9	119	15
Truck Loads/day *(4 month delivery /20days)	N/A	N/A	19	2	30	4

Table 2-2 summarizes the impacts, which are described in detail under each alternative.

Comparison of Alternatives and Impacts

IMPACT	ALTERNATIVES		
	A	B	C
Exotic Vegetation and Noxious Weed	Implementing this alternative would have no direct impact on the spread or introduction of exotic vegetation. However, due to the cumulative impacts of future development, the long-term spread of exotic species could be expected if appropriate mitigation measures are not	This alternative would result in a short-term minor adverse impact from exotic vegetation due to the risk of spread and introduction of exotic vegetation immediately after construction. Mitigation measures associated with this alternative should be sufficient to prevent or reduce long-term	This alternative would result in a short-term moderate adverse impact from exotic vegetation due to the risk of spread and introduction of exotic vegetation immediately after construction. Mitigation measures associated with this alternative should be sufficient to reduce the risk that

IMPACT	ALTERNATIVES		
	A	B	C
	taken.	impacts due to spread of exotic vegetation.	exotic vegetation does not become a long-term impact to the site and any spread or introduction is immediately contained.
Visitor Experience	Implementing this alternative would have no impact on visitor experience.	Implementation of Alternative B would only have a negligible to minor short-term adverse impact to visitor experience due to the traffic from the trucks delivering the soil. Visitor experience from the adjacent proposed wilderness area would only have a short-term minor adverse impact during construction. Closing the landfills would also have a moderate long-term beneficial impact to visitor experience.	Implementation of Alternative C would only have a short-term moderate adverse impact to visitor experience due to the traffic from the trucks delivering the soil. Visitor experience from the adjacent proposed wilderness area would only have a short-term moderate adverse impact during construction. Closing the landfills would also have a moderate long-term beneficial impact to visitor experience.

Chapter 3 - AFFECTED ENVIRONMENT

GCNP encompasses 1.2 million acres in northern Arizona. The proposed project is located at the North Rim of Grand Canyon National Park. The North Rim drains predominately south into the Grand Canyon. Although it appears relatively flat, numerous drainages and canyons cut the North Rim. Climatic conditions in the Grand Canyon region are diverse and elevation-based. Most of the precipitation comes from summer thunderstorms and winter rain and snow. The project area is located north of the Bright Angel Peninsula, a narrow portion of the Kaibab Plateau on which most of the development on the North Rim is located. The project areas are on relatively flat terrain at approximately 8,300 feet in elevation, and receive an average of 23 inches of precipitation and an average of 125 inches of winter snow accumulation annually. Average winter (January) temperature is 29 degrees F and average summer (July) temperature is 62 degrees F (http://iwin.nws.noaa.gov/iwin/az/az.html)

EXOTIC VEGETATION AND NOXIOUS WEEDS:

There are thirty (30) known exotic plant species documented on the North Rim area of GCNP. See appendix B for the list of Documented Exotic Plant Species and Potential Invasive Exotic Plant Species (Makarick, 2001). Marble Flats is covered with native grasses while vegetation on Lindberg Hill in relatively sparse. The landfill areas are surrounding by Ponderosa Pine and mixed conifer forest. All known and potential exotic plant species are of concern and will be eradicated and/or monitored for eradication.

VISITOR EXPERIENCE:

The main road into the North Rim of GCNP is Highway 67. In September and October 1999, the fee collection numbers for vehicles per day were 730 and 700 respectively. In September and October 2000, the fee collection numbers for vehicles per day were 600 and 500 respectively.

Marble Flats: The Marble Flats landfill is west of a dirt road off the main Highway 67. Marble Flats landfill is adjacent to the proposed wilderness. The W-1 road, which goes to Point Sublime, is adjacent to the Marble Flats landfill. Approximately 12-20 vehicles per day use the W-1 road. The Widforss trailhead is approximately 1 mile from the Marble Flats landfill. The Widforss trailhead has a small parking area adjacent to the trailhead at which 30 vehicles per day may park.

Lindberg Hill: The Lindberg Hill landfill site is east off the main Highway 67. The landfill is not open for public use. Adjacent to the landfill site the park operations uses the area for dry storage, staging area for construction activities and fire operations. The traffic flow off the main highway toward the landfill site is approximately 5 vehicles per day. Across the main Highway 67 from the landfill site road is a two-track road the park refers to as Range road. The Arizona Trail is 100 feet off the main Highway 67 on the park service road leading to the landfill site.

Chapter 4 - ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

The National Environmental Policy Act (NEPA) requires that environmental documents disclose the environmental impacts of the proposed federal action, reasonable alternatives to that action, and any adverse environmental effects that cannot be avoided should the proposed action be implemented. This section analyzes the environmental consequences of the three alternatives for the closure of two inactive landfills on the impact topics. This analysis provides the basis for comparing the alternatives. Because the analysis of impacts and effects will be the same for both landfills, it has been decided to collectively address impact analysis and effects of actions. Marble Flats and Lindberg Hill will not be analyzed separately due to the redundancy.

METHODOLOGY

The NPS-based impact analysis and conclusions in this documentation were based on park staff knowledge of the resources and site; review of existing literature and park studies; information provided by experts within the National Park Service, and other agencies; and professional judgment.

CUMULATIVE IMPACTS

A cumulative impact is described in regulations developed by the Council on Environmental Quality (CEQ), 40 CFR 1508.7. A "cumulative impact" is the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal), or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions, taking place over a period of time. Therefore, it is necessary to identify other ongoing or foreseeable future actions within the vicinity of the North Rim GCNP. For this analysis, foreseeable future actions were considered to be actions that could occur in the vicinity of the North Rim of GCNP within the next five years that currently have funding or funding is actively being sought. Five years was selected as the time frame for foreseeable future actions because most of the direct and indirect impacts of the proposal would occur within five years

The foreseeable future actions that will occur in the closest proximity of the two landfill areas are construction of restrooms at Widforss trail (Marble Flats) and lead abatement at the North Rim firing range (Marble Flats).

Other foreseeable future actions that involve new construction on the Bright Angel Peninsula include: the Administration building, 44 room dorm, Emergency Services building, Wildland Fire/EMS facility, repave Cape Royal Road to Point Imperial Spur, North Rim Restrooms, and Orientation Center exhibits. Foreseeable future actions that involve the rehabilitation and reuse of existing facilities/infrastructure include the amphitheater, water distribution system, campground, campground restroom, trailer park, old warehouse building #118, outlet fire trail repair. Foreseeable future actions occurring near the entrance of North Rim Grand Canyon National Park include the rehabilitation of the entrance station. See Appendix C for a short description of each of the foreseeable future actions.

IMPAIRMENT

In addition to determining the environmental consequences of the preferred and other alternatives, National Park Service policy (*Management Policies, 2001*) requires analysis of potential effects to determine whether or not actions would impair park resources.

The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. National Park Service managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adverse impacts on park resources and values. However, the laws do give the National Park Service the management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the National Park Service the management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement that the National Park Service must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible National Park Service manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any park resource or value may constitute an impairment. An impact would be more likely to constitute an impairment to the extent that it affects a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- Identified as a goal in the park's general management plan or other relevant NPS planning documents.

Impairment may result from National Park Service activities in managing the park, visitor activities, or activities undertaken by concessioners, contractors, and others operating in the park. A determination on impairment is made for every impact topic in each alternative.

Exotic Vegetation and Noxious Weeds

Methodology: For the purpose of the impact analysis for exotic vegetation and noxious weeds, the following definitions for intensity and duration are used to characterize the impacts.

Intensity: Intensity of impact is discussed in context of the North Rim of GCNP and is defined as follows:

- *Negligible*-impact to the exotic vegetation and noxious weeds are barely perceptible and not measurable and confined to a very small area.
- *Minor*-impact to the exotic vegetation and noxious weeds are perceptible or measurable and are localized.

- *Moderate*-impact is clearly detectable and could have appreciable effect on the exotic vegetation and noxious weeds.

- *Major*-impact would have a substantial, highly noticeable influence on the exotic vegetation and noxious weeds.

Duration: Duration of the impacts is defined as follows:

- *Short term*-impacts that would be less than about 5 years duration. Five years was selected as the difference between short and long term due to the length of construction (1-2 years) plus the length of revegetation and post-treatment (2-3 years).

- *Long term*-impacts that would be about 5 years or more in duration.

The main concern with exotic vegetation and noxious weeds are spread of existing populations and introduction of new invaders. All action alternatives would implement post-construction monitoring, revegetation efforts, and control treatments if necessary to contain an introduction if one were to occur.

ALTERNATIVE A – NO ACTION

Direct/Indirect Impacts: This alternative would not implement any ground disturbing activities and thus there would be no direct impacts to exotic vegetation and noxious weeds.

Cumulative Impacts: Alternative A would not contribute to cumulative effects. However, proposed foreseeable future developments would create new disturbed areas. Exotic vegetation and noxious weeds generally invade disturbed sites, and thus future developments would increase the potential for spread or introduction of exotic vegetation. Project specific mitigation measures would be implemented for these future projects to reduce the potential for spread or introduction of exotic vegetation.

Ongoing exotic vegetation control programs would continue, including hand pulling, mechanical treatments and a small amount of herbicide control. However, due to the size of the current program (mostly volunteer work) existing populations of exotic vegetation would continue to slowly spread and replace native vegetation.

Impairment: This alternative would cause no impairment to park resources or values. Impacts from exotic vegetation would not constitute impairment. Although it is not desirable, minor increases in exotic vegetation would not prevent the NPS from fulfilling the purpose of the park or preclude the opportunities for enjoyment of the park. In addition, minor increases in exotic vegetation would not harm the natural integrity of the park because it would be limited in extent and severity (minor).

Conclusion: Implementing this alternative would have no direct impact on the spread or introduction of exotic vegetation. However, due to the cumulative impacts of future development, the long-term spread of exotic species could be expected if appropriate mitigation measures are not taken.

ALTERNATIVE B – Alternative Closure Cap – Preferred Alternative

Direct/Indirect Impacts: The direct impact would involve the hauling of soil from outside the park and depositing it for grading on the landfills. This activity would increase the short-term risk of

spreading existing populations and introduction of new invaders. This alternative has the least amount of cubic yards of soil and the least number of trucks necessary to bring in the soil. Therefore, it has the least potential for introducing new invaders out of the action alternatives. In addition, mitigation measures implemented with this alternative, such as pressure washing equipment, pre-treatment, and staging area restriction, would reduce the short-term spread and introduction of invaders. Mitigation measures, such as the revegetation effort, post-construction monitoring, and follow-up treatments, would also reduce the intensity of impact and any long-term risk of spread and introduction of invaders.

Cumulative Impacts: This alternative would have the least impact to exotic vegetation and noxious weeds of the two action alternatives because less soil is required to close the landfills. Therefore, causing less possibilities of spreading invasive plant species. Ground disturbance associated with past, present, and foreseeable future developments, such as those described in Appendix C, would increase the this potential for spread and introduction of exotic vegetation. However, the ongoing exotic vegetation control program would continue and would help reduce any long-term risk of spread of exotic vegetation from past and present disturbed sites. Foreseeable future projects would incorporate mitigation measures to reduce the risk of spread and introduction of exotic vegetation. The combined impact of this proposal with past, present, and foreseeable future actions would be a long-term minor adverse impact. This is because of continued ground disturbance and continued trend of increased potential for spread and introduction of exotic vegetation.

Impairment: Impacts from exotic vegetation would not constitute impairment. Although it is not desirable, minor increases in exotic vegetation would not prevent the NPS from fulfilling the purpose of the park or preclude the opportunities for enjoyment of the park. In addition, minor increases in exotic vegetation would not harm the natural integrity of the park because it would be limited in extent and severity (minor).

Conclusion: The direct of effect of this alternative would result in a short-term minor adverse impact from exotic vegetation due to the risk of spread and introduction of exotic vegetation immediately after construction. Mitigation measures associated with this alternative should be sufficient to prevent or reduce long-term minor impacts due to spread of exotic vegetation.

ALTERNATIVE C – ADEQ Closure Cap

Direct/Indirect Impacts: The direct impact would involve the hauling of soil from outside the park and depositing it for grading on the landfills. This activity would increase the short-term risk of spreading existing populations and introduction of new invaders. This alternative has the most cubic yards of soil and the most trucks necessary to bring in the soil. Therefore, it has the highest potential for introducing new invaders. In addition, mitigation measures implemented with this alternative, such as pressure washing equipment, pre-treatment, and staging area restriction, would reduce the short-term of spread and introduction. Mitigation measures such as the revegetation effort, post-construction monitoring, and follow-up treatments, would reduce the intensity of impact and long-term risk of spread and introduction.

Cumulative Impacts: This alternative has the most potential for impact to exotic vegetation and noxious weeds of the action alternatives because more soil is required to close the landfills. Therefore, there are more possibilities of spreading invasive plant species. Ground disturbance associated with past, present, and foreseeable future developments, such as those described in Appendix C, would increase the long-term potential for spread and introduction of exotic vegetation. However, the ongoing exotic vegetation control program would continue and would help reduce the long-term risk of spread of exotic vegetation from past and present disturbed

sites. Foreseeable future projects would incorporate mitigation measures to reduce the risk of spread and introduction of exotic vegetation. The combined impact of this proposal with past, present, and foreseeable future actions would be a long-term moderate adverse impact due to the continued ground disturbance and continued trend of increased potential for spread and introduction of exotic vegetation.

Impairment: Impacts from exotic vegetation would not constitute impairment. Although it is not desirable, moderate increases in exotic vegetation would not prevent the NPS from fulfilling the purpose of the park or preclude the opportunities for enjoyment of the park. In addition, moderate increases in exotic vegetation would not harm the natural integrity of the park because it would be limited in extent and severity.

Conclusion: The direct effect of this alternative would result in a short-term moderate adverse impact from exotic vegetation due to the risk of spread and introduction of exotic vegetation immediately after construction. Mitigation measures associated with this alternative should be sufficient to reduce the risk that exotic vegetation does not become a long-term moderate impact to the site and any spread or introduction is immediately contained.

Visitor Experience:

Methodology: For the purpose of the impact analysis for visitor experience, the following definitions for intensity and duration are used to characterize the impacts.

Intensity: Intensity of impact is discussed in context of the North Rim of GCNP and is defined as follows:

- *Negligible*-impact to visitor experience is barely perceptible and not measurable and confined to a very small area.
- *Minor*-impact to visitor experience is perceptible and measurable and is localized.
- *Moderate*-impact is clearly detectable and could have appreciable effect on the visitor experience.
- *Major*-impact would have a substantial, highly noticeable influence on the visitor experience.

Duration: Duration of the impacts is defined as follows:

- *Short term*- impacts that would be less than about 5 years duration. Five years was selected as the difference between short and long term due to the length of construction (1-2 years) plus the length of revegetation and post-treatment (2-3 years).
- *Long term*- impacts that would be about 5 years or more in duration.

ALTERNATIVE A – NO ACTION

Direct/Indirect Impacts: This alternative would not implement any construction activities and thus there would be no impacts to visitor experience.

Cumulative Impacts: Alternative A would not contribute to cumulative effects. However, many of the proposed foreseeable future developments are part of the 1995 General Management Plan for the park. Much of this GMP focused on the management necessary to provide for meaningful visitor experiences, while protecting park resources. The management emphasis for the North Rim included providing a low-key uncrowded atmosphere for the visitor and include improvements in orientation/interpretive facilities, and integral administrative functions to achieve this goal. The expected long-term impact of implementation of current and future projects on the North rim is expected to result in moderate long-term beneficial impacts to visitor experience. Short-term impacts during construction are expected to be negligible to minor, provided mitigation measures are followed that would minimize conflicts with visitors and employees, such as timing (seasonal and daily) and noise restrictions.

Impairment: There is no impairment to visitor experience with this alternative.

Conclusion: Implementing this alternative would have no impact on visitor experience.

ALTERNATIVE B – Alternative Closure Cap – Preferred Alternative

Direct/Indirect Impacts: Because less soil will be hauled on public roads than is required in Alternative C, the direct impact of this action to visitor experience would be a short-term minor adverse impact. Less soil importation will reduce the amount of trucks seen by visitors and will reduce the traffic flow disturbances. Indirectly, visitors may experience a short-term minor adverse impact within the adjacent proposed wilderness area due to activities occurring during construction. This alternative will restore as closely as possible the natural conditions historically found at the landfill sites. Closing the landfills would have direct and indirect minor long-term beneficial impacts to visitor experience.

Cumulative Impacts: Many of the proposed foreseeable future developments are part of the 1995 General Management Plan for the park. Much of this GMP focused on the management necessary to provide for meaningful visitor experiences, while protecting park resources. The management emphasis for the North Rim included providing a low-key uncrowded atmosphere for the visitor and included improvements in orientation/interpretive facilities, and integral administrative functions to achieve this goal. The expected long-term impact of implementation of current and future projects on the North Rim is expected to result in moderate long-term beneficial impacts to visitor experience. Short-term impacts during construction are expected to be negligible to minor, provided mitigation measures are followed that would minimize conflicts with visitors and employees, such as timing (seasonal and daily) and noise restrictions. Therefore, the combined impact of Alternative B with past, present, and foreseeable future action would likely be a negligible to minor, adverse impact in the short-term and a moderate, beneficial impact in the long-term.

Impairment: These impacts would not constitute impairment because they would not prevent the NPS from fulfilling the purpose of the park or preclude the opportunities for enjoyment of the park.

Conclusion: Implementation of Alternative B would only have a negligible to minor short-term adverse impact to visitor experience due to the traffic from the trucks delivering the soil. Within the adjacent proposed wilderness area visitors may experience a short-term minor adverse impact during construction. Closing the landfills would also have a moderate long-term beneficial impact to visitor experience.

ALTERNATIVE C – ADEQ Closure Cap

Direct/Indirect Impacts: Because more soil will be hauled on public roads than is required in Alternative B, the direct impact of this action to visitor experience would be a short-term moderate adverse impact. Greater soil importation would substantially increase the number of trucks seen by visitors and would increase the traffic flow disturbances. Indirectly, visitors may experience a short-term moderate adverse impact within the adjacent proposed wilderness area due to impacts occurring during construction. This alternative will restore as closely as possible the natural conditions historically found at the landfill sites. Closing the landfills would have direct and indirect minor long-term beneficial impacts to visitor experience.

Cumulative Impacts: Many of the proposed foreseeable future developments are part of the 1995 General Management Plan for the park. Much of this GMP focused on the management necessary to provide for meaningful visitor experiences, while protecting park resources. The management emphasis for the North Rim included providing a low-key uncrowded atmosphere for the visitor and included improvements in orientation/interpretive facilities, and integral administrative functions to achieve this goal. The expected long-term impact of implementation of current and future projects on the North Rim is expected to result in moderate long-term beneficial impacts to visitor experience. Short-term impacts during construction are expected to be minor to moderate, provided mitigation measures are followed that would minimize conflicts with visitors and employees, such as timing (seasonal and daily) and noise restrictions. Therefore, the combined impact of Alternative C with past, present, and foreseeable future actions would likely be a moderate, adverse impact in the short-term and a moderate, beneficial impact in the long-term.

Impairment: These impacts would not constitute impairment because they would not prevent the NPS from fulfilling the purpose of the park or preclude the opportunities for enjoyment of the park.

Conclusion: Implementation of Alternative C would have a short-term moderate adverse impact to visitor experience due to the traffic from the trucks delivering the soil. Within the adjacent proposed wilderness area visitors may experience a short-term moderate adverse impact during construction. Closing the landfills would also have a moderate long-term beneficial impact to visitor experience.

Chapter 5 - Consultation / Coordination

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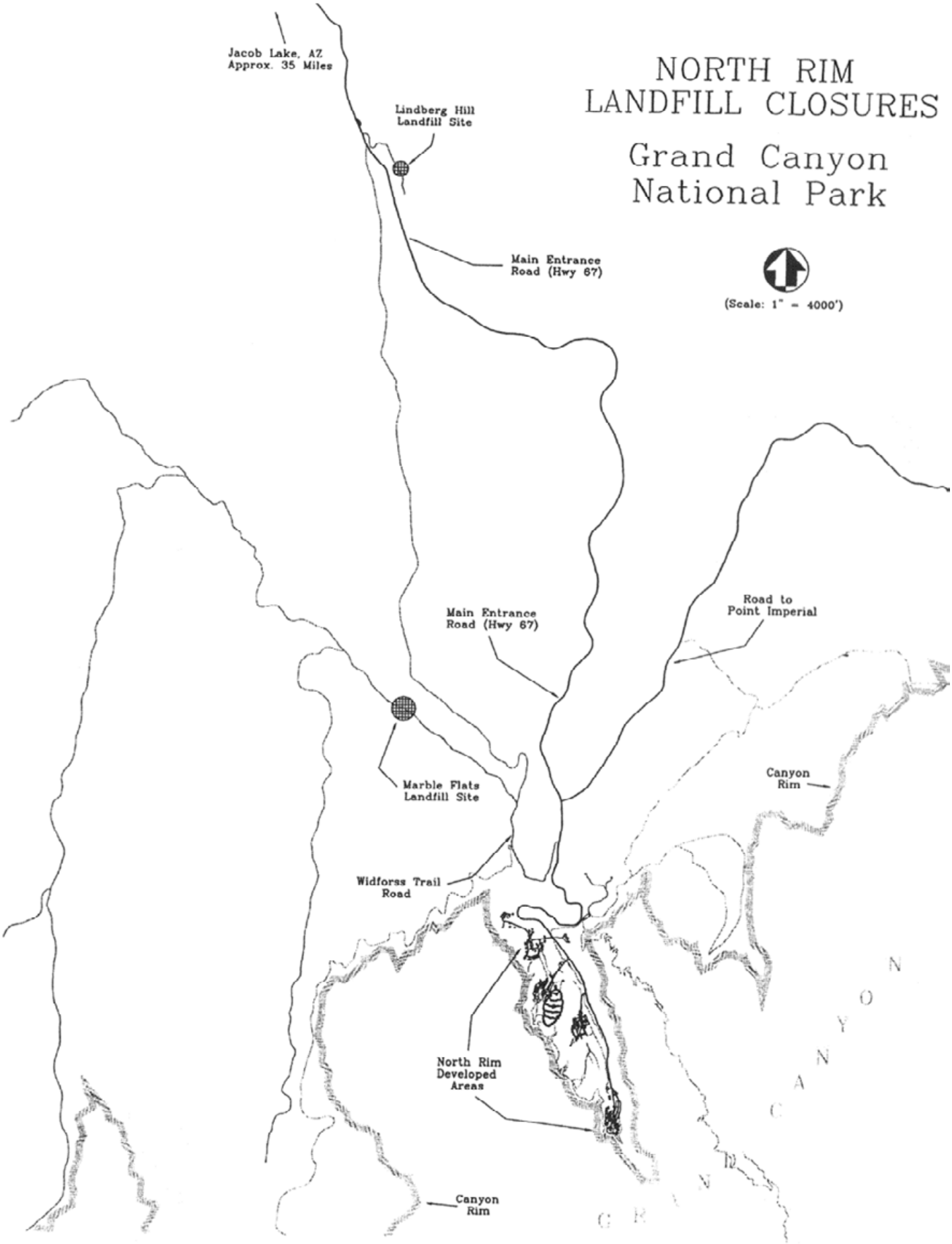
APPENDIX A

Vicinity Map Location

Marble Flats Location

Lindberg Hill Location


NORTH RIM
LANDFILL CLOSURES
Grand Canyon
National Park
Jacob Lake, AZ
Approx. 35 Miles
Lindberg Hill
Landfill Site
Main Entrance
Road (Hwy 67)
(Scale: 1" = 4000')
Main Entrance
Road (Hwy 67)
Road to
Point Imperial
Marble Flats
Landfill Site
Canyon
Rim
Widforss Trail
Road
North Rim
Developed
Areas
Canyon
Rim
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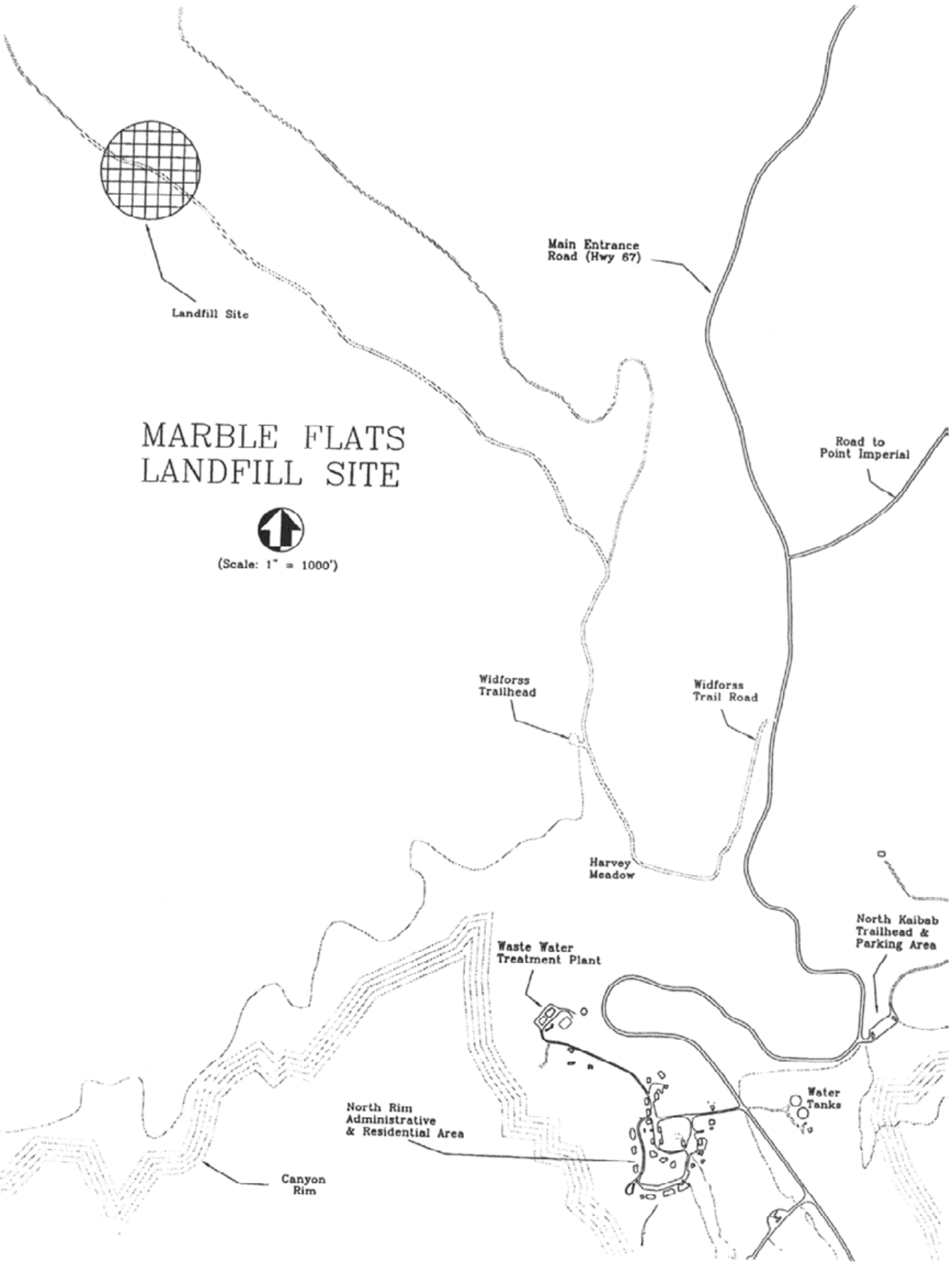
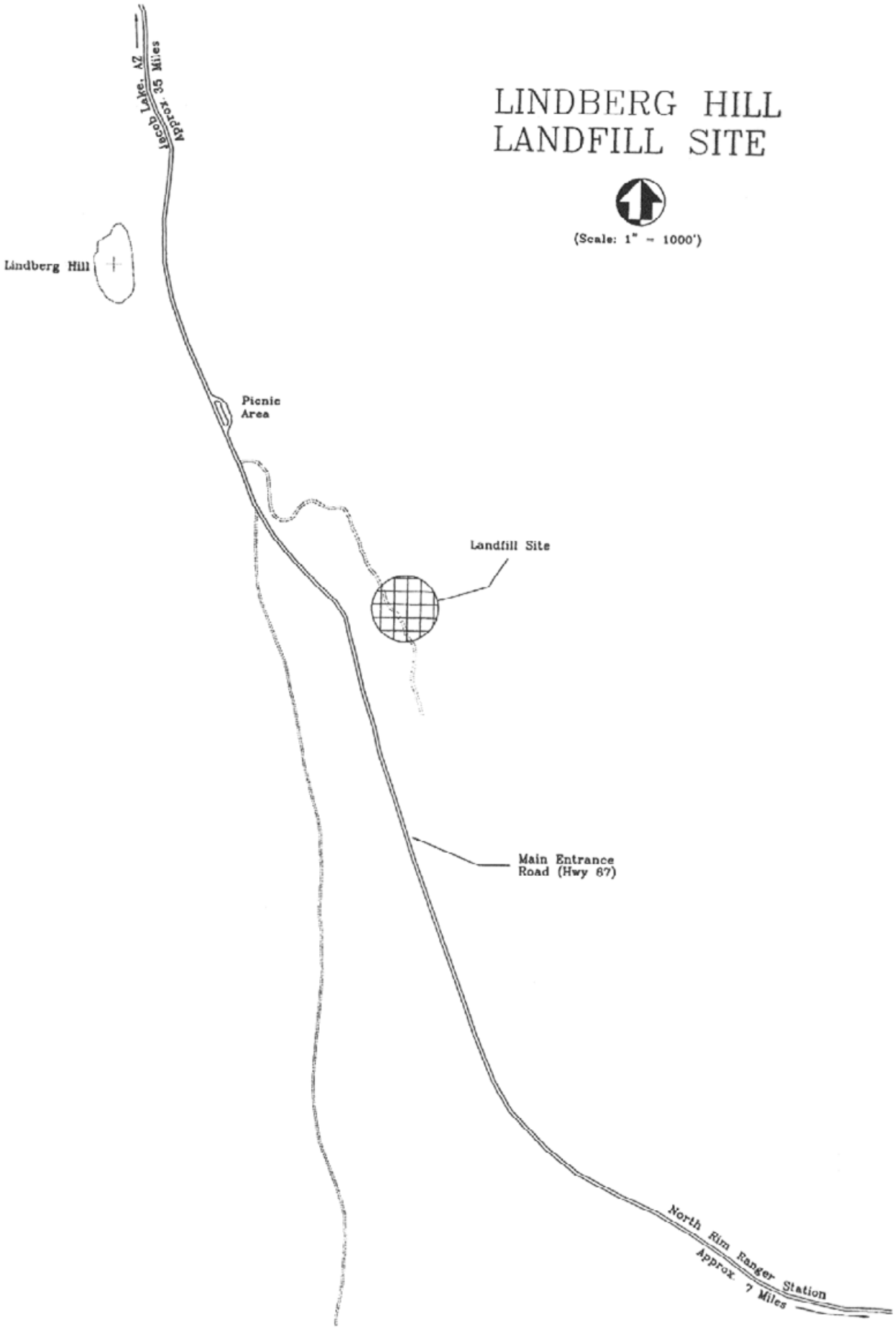

MARBLE FLATS
LANDFILL SITE
(Scale: 1" = 1000')
Landfill Site
Main Entrance
Road (Hwy 67)
Road to
Point Imperial
Widforss
Trailhead
Widforss
Trail Road
Harvey
Meadow
North Kaibab
Trailhead &
Parking Area
Waste Water
Treatment Plant
Water
Tanks
North Rim
Administrative
& Residential Area
Canyon
Rim

LINDBERG HILL LANDFILL SITE



(Scale: 1" = 1000')

APPENDIX B

List of Exotic Plants and Noxious Weeds

Documented Exotic Plant Species North Rim, Grand Canyon National Park* **Makarick L. 2001**			
Scientific Name	**Family**	**Common Name**	**Urgency Ranking/**
Agrostis stolonifera	Poaceae	Red top grass	High
Avena fatua	Poaceae	Wild oat	Medium
Bromus inermis	Poaceae	Smooth brome	High
Bromus tectorum	Poaceae	Cheatgrass	Medium
Chenopodium album	Chenopodiaceae	Lambsquarter	Medium
Chrysanthemum leucanthrum	Asteraceae	Oxeye daisy	High
Conioselinum scopulorum	Apiaceae	Hemlock parsley	
Cynoglossum officinale	Boraginaceae	Houndstongue	High
Dactylis glomerata	Poaceae	Orchard grass	High
Elymus repens	Poaceae	Quackgrass	Medium
Erodium cicutarium	Geraniaceae	Filaree	Medium
Galium aparine	Rubiaceae	Bedstraw	Medium
Lactuca serriola	Asteraceae	Prickly lettuce	Low
Linaria dalmatica	Scrophulariaceae	Dalmatian toadflax	High
Lolium perenne	Poaceae	Perennial ryegrass	Medium
Malva neglecta	Malvaceae	Common mallow	Medium
Marrubium vulgare	Lamiaceae	Horehound	High
Melilotus alba	Fabaceae	Alfalfa	Low
Melilotus officinalis	Fabaceae	Annual sweet clover	Medium
Phleum pratense	Poaceae	Common timothy	Medium
Plantago lanceolata	Plantaginaceae	Buckhorn plantain	Medium
Poa compressa	Poaceae	Canada bluegrass	Medium
Poa pratensis	Poaceae	Kentucky bluegrass	Medium
Polypogon monspeliensis	Poaceae	Rabbitfoot grass	Medium
Prunella vulgaris	Lamiaceae	Healall	Medium

Rumex acetosella	Polypogonaceae	Sheep sorrel	Medium
Sorghum halepense	Poaceae	Johnson grass	High
Stellaria media	Caryophyllaceae	Common chickweed	Medium
Taraxacum officinale	Asteraceae	Common dandelion	Medium
Tragopogon dubius	Brassicaceae	Yellow salsify	Low
Trifolium repens	Fabaceae	White clover	Medium

Potential Invasive Exotic Plant Species
North Rim, Grand Canyon National Park and Surrounding Areas* Makarick L. 2001

Scientific Name	Family Name	Common Name
Acroptilon repens	Asteraceae	Russian knapweed
Aegilops cylindrica	Poaceae	Jointed goatgrass
Alternanthera philoxeroides	Amaranthaceae	Alligator weed
Alhagi maurorum	Fabaceae	Camelthorn
Ailanthus altissima	Simarubaceae	Tree of heaven
Cardaria chalepensis	Brassicaceae	Lens podded hoary cress
Cardaria draba	Brassicaceae	Whitetop
Cardaria pubescens	Brassicaceae	Hairy whitetop
Carduus acanthoides	Asteraceae	Plumeless thistle
Carduus nutans	Asteraceae	Musk thistle
Cenchrus sp.	Asteraceae	Sandburs
Centaurea calcitrapa	Asteraceae	Purple starthistle
Centaurea diffusa	Asteraceae	Diffuse knapweed
Centaurea iberica	Asteraceae	Iberian starthistle
Centaurea maculosa	Asteraceae	Spotted knapweed
Centaurea solstitialis	Asteraceae	Yellow starthistle
Centaurea squarrosa	Asteraceae	Squarrose knapweed
Coronopus squamatus	Brassicaceae	Creeping wartcress, greater swinecress
Cucumis melo	Cucurbitaceae	Dudaim melon, Queen Anne's melon
Cuscuta sp.	Convolvulaceae	Dodder
Cynodon dactylon	Poaceae	Bermuda grass
Drymaria arenarioides	Caryophyllaceae	Lightningweed, sandwort drymary
Eichhornia azurea	Hydrophyllaceae	Anchored water hyacinth
Eichhornia crassipes	Hydrophyllaceae	Floating water hyacinth
Elymus repens	Poaceae	Quackgrass
Euphorbia esula	Euphorbiaceae	Leafy spurge
Heliathus ciliaris	Asteraceae	Texas blueweed
Hydrilla verticillata	Hydrocharitaceae	Waterthyme
Ipomoea triloba	Convolvulaceae	Three-lobed morning glory
Isatis tinctoria	Brassicaceae	Dyers woad
Lepidium latifolium	Brassicaceae	Whitetop
Lythrium salicaria	Lythraceae	Purple loosestrife
Medicago polymorpha	Fabaceae	Burclover
Nassella trichotoma	Poaceae	Serrated tussock
Onopardum acanthium	Asteraceae	Scotch thistle
Orobanche ramosa	Orobanchaceae	Branched broomrape

Panicum repens	Poaceae	Torpedo grass
Peganum harmala	Zygophyllaceae	African rue
Pennisetum clandestinum	Poaceae	Kikuyu grass
Portulaca oleracea	Portulacaceae	Common purslane
Rorippa austriaca	Brassicaceae	Austrian fieldcress
Salvia aethiopis	Lamiaceae	Mediterranean
Senecio jacobaea	Asteraceae	Tansy ragwort
Solanum carolinense	Solanaceae	Carolina horsenettle
Sonchus arvensis	Asteraceae	Perennial sowthistle
Stipa brachychaeta	Poaceae	Puna grass
Striga spp.	Scrophulariaceae	Witchweed
Taeniatherum caput-medusae	Poaceae	Medusahead
Trapa natans	Trapaceae	Water-chestnut
Verbascum thapsus	Scrophulariaceae	Common mullein

APPENDIX C

Foreseeable Future Actions

Rehab North Rim Water Distribution System - This project would replace approximately 14,500 linear feet of worn-out, leaking, undersized, and shallow water lines with new water pipes, for purposes of water and energy conservation, and fire protection. New fire hydrants would also be installed. There are many problems with the existing North Rim potable water distribution system. Many lines are old, are in poor condition, and are leaking (estimated at more than 11,000 gallons per day). Some pipes needed for the shoulder seasons are too shallow to protect against freezing. The water pressure in areas also is too low to safely operate fire sprinkler systems or even satisfy ordinary domestic needs.

Rehab North Rim Campground and Relocate Roads - The campground portion of this project would re-surface the roads within the campground, relocate the entry road configuration, construct a new fee collection station and demolish the existing one, construct four campsite access spurs for tent camping, and construct a new parking area entry. The total amount of disturbance would be approximately 0.3 acres. These project components have been proposed to address the following concerns: campground roads are severely deteriorated and are causing soil compaction and erosion problems; The existing entry road configuration no longer efficiently accommodates the current volume of visitors. Vehicle stacking in front of the fee collection station frequently blocks vehicle access to the nearby store. The existing configuration does not adequately provide for increased parking needs and easy vehicle exit from the campground; tent camping sites are not paved and are ill-defined, causing resource problems; the existing fee collection station is inadequately providing for the needs of the employees who work in it and the campground registration system. The Lodge road portion of this project would change public access routes to the Lodge. Only service vehicles would be allowed to park next to Grand Canyon Lodge, and public traffic would be encouraged to use the main parking lot. The terminus of the main road would be reconfigured to allow for tour busses to turn around and discharge and pickup guests. The main parking area would be reconfigured to allow for RV and bus parking. The existing road segment between the parking area and the lodge would be converted primarily to pedestrian use. These project components have been proposed to address the following concerns: The current configuration of the road to the lodge is causing traffic congestion and vehicle/pedestrian conflicts, diminishing the visitor experience and increasing safety concerns.

Construct a New North Rim Visitor Services/Administrative Building - This project would demolish the existing visitor services/administrative building and construct a larger 2,467 square foot building near the same site. The new building would support the North Rim backcountry permit system, visitor contact services, public restroom and administrative offices. Various building designs are being considered in order for the building to be compatible with the adjacent cultural landscape and the historic district, while still accommodating the administrative and visitor needs of the building. The proposed new building layout would include a 15-car, 2-RV parking area, concrete walkways and a new access road to the parking area from the main road. Most of the ground disturbance would be in areas already disturbed (i.e., the existing building footprint) or open areas. Tree removal will primarily be limited to the entrance road.

The parking area would be configured as a loop to allow for easy ingress and egress of vehicles, while maintaining existing ground cover and trees in the center. The proposed building and parking area would be located near the footprint of the original Headquarters building and between existing residential areas. The current road access to the existing visitor services/administrative building would no longer be used by visitors and would be restricted to residential and administrative use. This project is needed to address the following management concerns: The existing visitor services/administrative building for the North Rim District replaced the original building that was destroyed by fire in 1983. The current building is a temporary pre-manufactured structure installed in 1984. It has deteriorated from the effects of heavy snows and snowmelt for which the structure was not designed. The location of the current building is not conducive to the increased volume of traffic that has occurred within the Park and has created traffic and parking congestion within an otherwise primarily residential area. The existing building is also not of sufficient size to fully accommodate the increasing administrative needs of the North Rim Unit.

Construct North Rim Orientation Center Exhibits – This project would include the installation of a lighting system, flagpole, 2 orientation panels, and 3-4 interpretive panels at the North Rim Visitor Center Plaza. These project components were identified during the planning phase for the new North Rim Visitor Center, but have not been implemented. Completing this final phase of the Visitor Center project will greatly facilitate visitor orientation, allow visitors to safely navigate from the parking areas to various facilities after hours, and provide an opportunity to interpret the North Rim's developmental history. All construction will be in previously disturbed areas behind the Visitor Center and adjacent to the parking lot.

Construct North Rim Emergency Services Building - A 4,193 square-foot building would consolidate all EMS operations into one location and replace several smaller buildings. It would house emergency vehicles and equipment, provide a temporary prisoner holding facility, and provide office space and a training room. Two alternative sites are being considered – one near the site of the proposed visitor services/administrative building and one near the water tanks, next to the proposed wildland fire complex. The existing fire station is too small for modern emergency vehicles and is not able to hold all emergency service equipment and supplies. Portions of the fire engine must be disassembled before it can be stored and then be reassembled before it can respond to a call, resulting in delayed response times. The existing building has safety problems due to inadequate ventilation of vehicle exhaust fumes and a lack of safeguards for keeping prisoners in the building. Having emergency equipment stored in separate locations reduces operational efficiency.

Repair/Rehab North Rim Amphitheater – This project would entail major restoration of the 150-seat amphitheater, which was built in 1957 and is on the list of Classified Structures. The amphitheater is unsafe for visitors and employees. Project components include replacing about 800 linear feet of damaged asphalt paths, replacing the wooden stage, replacing or restoring the screen and wood pillars, replacing/repairing 46 log benches, and replacing faulty electrical wiring.

Rehab North Rim Entrance Station - The historic entrance station is in disrepair and needs rehabilitation. Facilities at the site also need to be upgraded to provide essential visitor services and to enable park staff to accomplish their jobs more effectively. In particular, the station has a very poor ventilation system, resulting in park staff breathing auto exhaust fumes. There are no permanent restrooms for staff or visitors. The single entrance lane creates long lines, delaying park staff and visitors. The signs in the area are old and outdated. The Park has not yet developed a specific proposal

for how best to address the needs for action listed above, but is considering options for repairing or replacing the existing building, reconfiguring the road and parking lot, replacing the entrance sign and gate and constructing a new restroom.

Conduct Lead Abatement and Improve North Rim Firing Range – There are 2 firing ranges in the Park that are used by Park Rangers, one on the North Rim and one on the South Rim. Firing range operations have deposited unacceptable levels of lead into the immediate area surrounding the ranges. It is an EPA requirement to clean up the lead accumulations and was noted during a recent EPA facility assessment. Removed soil will be replaced with borrow material, and a two point facility at the North Rim will incorporate "bullet-catchers" to eliminate future problems.

Construct 44 room dorm – Due to the housing shortage the concessioner is required to build a dormitory to house the permanent and seasonal staff for the park. The location of the dormitory will be covered in a separate environmental assessment.

Repave Cape Royal Road to Point Imperial Spur – A Federal Highways project to repave the road along Cape royal road to Point Imperial spur will be initiated soon.

Trailer park –The trailer park at the North Rim needs repair. This project proposes to implement routine maintenance, repair to the site and some additional trailer pads for the employees.

Rehab/Reuse old warehouse building #118 – Due to the constraints on office space and conference room area. A project has been proposed to rehab/reuse the old warehouse building for the use of a conference room and office space for NPS staff.

Outlet fire trail repair – Due to the Outlet Fire in May of 2000, this project proposes to repair the trail for future use.

Construct North Rim Wildland Fire/Fire Pro Facility-This facility would consist of a 5,300 square-feet space for housing a fire crew, 1,800 square feet of offices, a 2,800 square-feet space for a fire engine, and space for a helibase, fire cache, and storage for hazardous materials. The existing housing facilities for the fire crew do not meet NPS standards. The fire crew stays in uninsulated and rodent-infested cabins, or in tent frames in locations that often experience below freezing temperatures during the times they are in use. The wildland fire engine also must park outside, which increases maintenance costs and reduces the availability of the engine to respond to fires. There is also insufficient space for offices and for storage of equipment and supplies.

Replace existing chemical toilet with new vault toilet at North Kaibab Trailhead- The primary visitor compliant received by the Park is the inadequacy of the restroom facilities. Most of the existing restrooms are old, over-crowded or portables added to meet the increasing demand.

Replace and construct new vault toilets at Cape Royal and Point Imperial - The primary visitor compliant received by the Park is the inadequacy of the restroom facilities. Most of the existing restrooms are old, over-crowded or portables added to meet the increasing demand.

Construct new vault toilet at Widforss Trailhead - The primary visitor compliant received by the Park is the inadequacy of the restroom facilities. Most of the existing restrooms are old, over-crowded or portables added to meet the increasing demand.

Replace existing chemical toilet with new flush toilets and add vault toilet at the North Rim Campground Group Site - The primary visitor compliant received by the Park is the inadequacy of the restroom facilities. Most of the existing restrooms are old, over-crowded or portables added to meet the increasing demand.

Repair/Rehab of existing restrooms at North Rim Campground - The primary visitor compliant received by the Park is the inadequacy of the restroom facilities. Most of the existing restrooms are old, over-crowded or portables added to meet the increasing demand.

APPENDIX D

List 1. List of Special Status Species, Us Fish and Wildlife Service